

Investigation of supercritical geothermal reservoir by magnetotelluric method

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Subsurface fluids in a supercritical state (high temperature and pressure of $>374^{\circ}\text{C}$ and $>22.1\text{ MPa}$) have gained attention as next-generation geothermal resources because they can offer significantly more energy than conventional geothermal fluids with temperatures $<350^{\circ}\text{C}$. Supercritical geothermal fluids are believed to be found in various volcanic areas worldwide. Although an understanding of the spatial distribution and fluid fraction of supercritical fluids is necessary for their resource assessment, the spatial distribution and fluid fraction of supercritical geothermal reservoirs are poorly understood. Therefore, we used the magnetotelluric (MT) method to obtain information on the spatial distribution and fluid fraction of a supercritical geothermal reservoir in the Yuzawa geothermal field, northeastern Japan. Our MT data revealed a potential supercritical geothermal reservoir of 3 km (width) $\times$ 5 km (length) at a depth of 2.5–6 km with a fluid fraction estimated to be 0.5–2% and a salinity of 5–10 wt%.

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